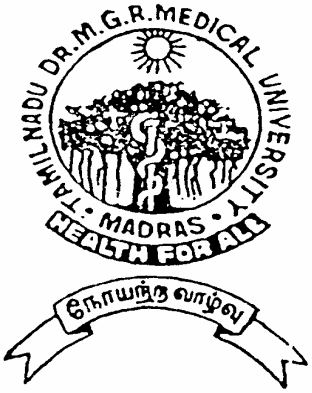
*DISSERTATION SUBMITTED FOR*

# ANALYSIS OF SOCIO DEMOGRAPHIC AND CLINICAL ASPECTS OF ACUTE DIARRHOEAL DISEASE AMONG ADULTS

*M.D DEGREE*

*(Branch I) GENERAL MEDICINE*

*MARCH 2007*




***THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY***

***CHENNAI, TAMIL NADU.***

# *CERTIFICATE*

*This is to certify that the dissertation titled* **" ANALYSIS OF SOCIO DEMOGRAPHIC AND CLINICAL ASPECTS OF ACUTE DIARRHOEAL DISEASE AMONG ADULTS "** submitted by **Dr. O. CHANDRAN** to the Faculty of General Medicine , The Tamilnadu Dr. M.G.R. Medical university, Chennai in partial fulfillment of the requirement for the award of M.D. Degree (General Medicine) is a bonafide research work carried out by him under our direct supervision and guidance.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# *DECLARATION*

*I,* **Dr. O.CHANDRAN** , *solemnly declare that the dissertation titled*

"**ANALYSIS OF SOCIO DEMOGRAPHIC AND CLINICAL ASPECTS OF ACUTE DIARRHOEAL DISEASE AMONG ADULTS**"

*has been prepared by me.*

*This is submitted to the* ***Tamilnadu Dr. M.G.R. Medical University****, Chennai in partial fulfillment of the rules and regulations for the M.D. Degree Branch I (General Medicine).*

*Place : Madurai*

*Date :* **Dr. O.CHANDRAN**

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I would grossly fail in my duty if I fail to mention here of my **patients** who have ungrudgingly borne the pain and discomfort of investigations. I cannot but pray for their speedy recovery and place this study as a tribute to them and to the numerous others likely affected.

# CONTENTS

# INTRODUCTION

Medicine has a long history; recent decades have witnessed particularly vigorous development in the field. Over the last 25 years, the subject has evolved into a multi dimensional repository of knowledge on spatial aspects of Human health. The more recently developed area of concern considers the availability and accessibility of health care facilities, including patient travel patterns, inequalities in health care provision, modeling future demand for facilities, and the relationship between need and Socio-economic and cultural factors.

Sociodemographic studies the effects of locale and climate upon health. It aims to improve the understanding of the various factors which affect the health of populations and hence individuals. Disease can be best understood by most of the people within the context of health. Health and Disease cannot be viewed as an opposing side of a coin, but instead they are co-existing overlapping State (Pyle, 1979). The WHO (1948) has defined “Positive Health” as the “state of complete physical, mental, and social well being” and not merely the absence of the disease or infirmity. A holistic understanding of the

essence of Socio-demographic studies is not necessarily to be found by exploration of the variety of topical approaches, particularly if any are taken in deterministic isolation.

The theoretical base of this study is to describe the distribution and size of disease problems in human population and to provide the data essential for the management, evaluation and planning of services for the prevention, control and treatment of disease.

Disease is studied in relationship to factors such as Social status, income occupation, housing, overcrowding, social customs, habits, and behavior. The society is prone for so many diseases. The diseases are caused by so many agents vary from small viral infection to heart and brain diseases. The kinds of diseases which are present; the number of people affected by each disease; the geographical variation in the distribution of diseases; the section of the community which is affected by each disease (i.e., whether the disease is confined to one age group, one sex, one class or profession etc.), whether the disease is more wide spread at certain season, the nature of each disease, its virulence and endemic or epidemic frequencies.

Diarrhoea is one of the most important diseases in India. Diarrhoea today continues to remain an important public health problem both in rural and urban areas. All the studies in medical geography are concerned with the description of spatial variations of a particular disease and are attempted at the regional level but limited with respect to micro level. In this context, the present study has focused its importance of micro level to study the spatial distribution of diarrhoeal disease among Adults and to analyze the interrelationships between prevalence rate of diarrhoeal disease in relation to socio-economic, environment, and cultural factors.

The present study attempts to analyze the factors such as unpurified water, food contamination, personal hygiene, poor standard of living that were the major cause for diarrhoeal disease. Hence, the present study attempts to describe the diarrhoeal disease in Adult and its association with selected environmental factor.

## AIMS AND OBJECTIVES

- To analyze the prevalence rate of the diarrhoeal diseases in Adult at Madurai city.
- To analyze the spatial distribution of the diarrhoeal diseases in Adult at Madurai city.
- To observe the regional and identify the causes for its occurrence.
- To identify social aspects of the diarrhoeal disease in Adult with reference to socio economic conditions.
- To identify and to analyze major regions of diarrhoeal disease in Adult and to observe related environmental conditions
- To analyze the precipitating factors for the occurrence of the diarrhoeal disease in Adult with reference to drinking water supply, personal hygiene, nutritional factors and so on.

# REVIEW OF LITERATURE

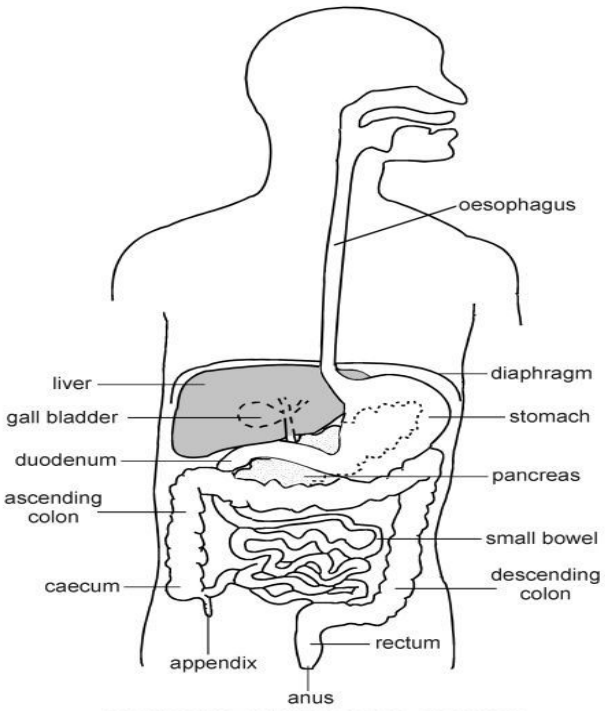
## DIARRHOEAL DISEASE: DEFINITION

**Diarrhoea** is defined as the passage of loose, liquid, or watery stool. These liquid stools are usually passed more than three times a day. However, it is the recent changes in consistency and character of stools rather than the number of stools that is more important.usually stool weigh >200g/day

Patients may experience abdominal pain, fever, nausea, or blood in the stool. Diarrhoea is a common problem that usually lasts a few days and does not typically require treatment. However, Diarrhoea can become life threatening when it causes severe dehydration, especially in the very young, the elderly, or patients with compromised immune systems.

Diarrhoeal diseases mostly result from ingestion of harmful microorganisms with food and water, although in some cases short episodes of diarrhoea may result from eating poisonous substances, and difficult to digest food, or through physiological intolerance of certain foods.

Diarrhoea caused by virus, bacteria or parasites possesses two characteristics- firstly, the offending organisms colonize the intestine and as a consequence cause inflammation of the intestine or enteritis; and secondly, they upset the balance of intestinal fluid absorption and secretion mechanism, often enhancing the latter very considerably, which is then manifested as watery stool discharged frequently in large volumes. Most diarrhoeal episodes are acute infections of the intestine and are self-limiting illnesses lasting for a few days but requiring treatment either to correct the lost fluid or to contain the tissue damage or other complications of the infection.



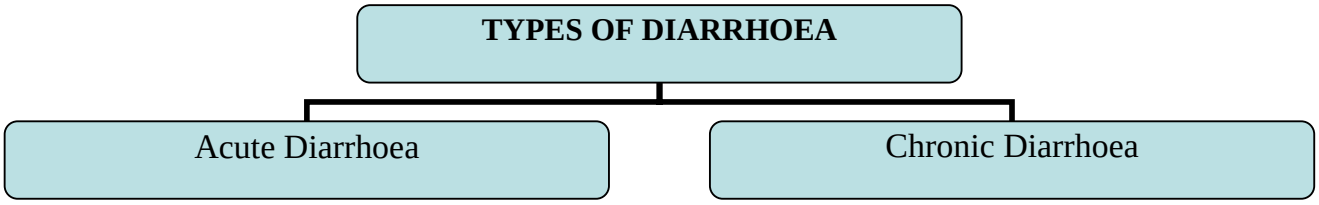
GASTROINTESTINAL TRACT - GENERAL

Different processes in the body may promote diarrhoea. These include a failure of the intestines to absorb adequate nutrients and fluids during digestion, the release of too much fluid into the digestive tract or complications as the result of intestinal disorders.

## TYPES OF DIARRHOEA

There are two major types of diarrhoea. They are:

### TYPES OF DIARRHOEA




## ACUTE DIARRHOEA

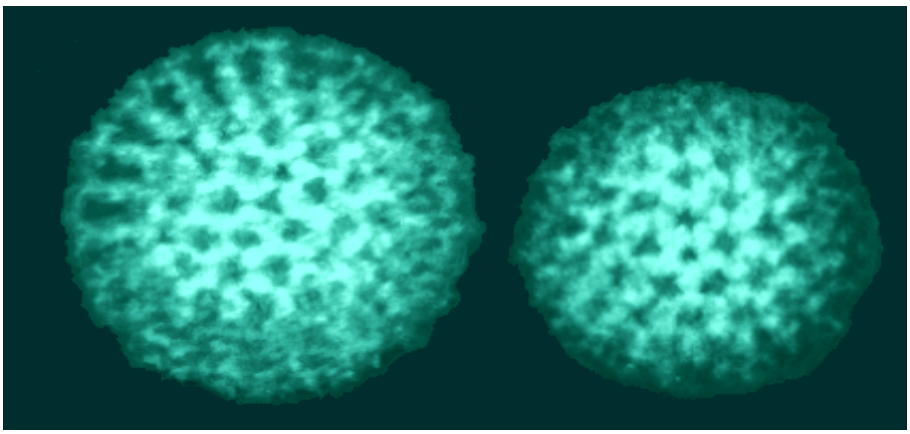
Acute Diarrhoea may define as diarrhoea that lasts less than 2 weeks. This can nearly always be presumed to be infective although this is proven in a minority of cases. In more severe cases or where it is important to find the cause of the illness stool cultures are instituted.

The most common organisms found are Campylobacter (an organism of animal or chicken origin), salmonella (also often of animal origin), Cryptosporidiosis (animal origin), Giardia Lamblia (lives in drinking water).

Shigella (dysentery) is less common and usually human in origin. Cholera is rare in Western countries. It is more common in travelers and is usually related to contaminated water (its ultimate source is probably seawater). E Coli is probably a very common cause of diarrhoea, especially in travelers, but it can be difficult to detect using current technology. The types of E. coli vary from area to area and country to country. Viruses, particularly rotavirus is common in children. (Viral diarrhoea is probably over-diagnosed by non-doctors). The Norwalk virus is rare. Toxins and food poisoning can cause diarrhoea. These include staphylococcal toxin (see Staphylococcus) (often contaminated milk products due to an infected wound in workers), and Bacillus cereus (e.g. rice in Chinese take a ways). Often "food poisoning" is really salmonella infection. Diarrhoea is a common side effect of drugs (especially antibiotics). Clostridium difficile infection is potentially serious and is often related to antibiotic use. Parasites and worms sometime cause diarrhoea but often present with

weight loss, irritability, rashes, or anal itching. The commonest is pinworm (mostly of nuisance value rather than a severe medical illness). Amoebic dysentery due to Entamoeba histolytica is an important cause of bloody diarrhoea in travelers and sometimes in western countries, which requires appropriate and complete medical treatment.

**ROTAVIRUS**



**CHRONIC DIARRHOEA**

- ✓ Infective diarrhoea:

Diarrhoea due to some organisms may persist for years without significant long-term illness. More commonly a diarrhoea will slowly ameliorate but the patient becomes a carrier (harbors the infection without illness). This is often an indication for treatment, especially in food workers or institution workers.

Parasites (worms and amoeba) should always be treated. Salmonella is the most common persistent bacterial organism in humans.

✓ Non-infective diarrhoea:

These tend to be more severe medical illnesses. Malabsorptions: This is due to the inability to absorb food, mostly in the small bowel but also due to the pancreas. Causes include celiac disease (intolerance to gluten, a wheat product), lactose intolerance (Intolerance to milk sugar, common in non-Europeans), fructose malabsorptions, Pernicious anemia (impaired bowel function due to the inability to absorb vitamin B12), loss of pancreatic secretions (may be due to cystic fibrosis or pancreatitis), short bowel syndrome (surgically removed bowel), radiation fibrosis (usually following cancer treatment), other drugs such as chemotherapy, and of course, diarrhoea-predominant irritable bowel syndrome.

## DIARRHOEAL DISEASES IN THE WORLD

Diarrhoea is an important cause of under nutrition. This is because patients eat less during diarrhoea and their ability to absorb nutrients is reduced; moreover, nutrient requirements are

increased because of infection. Each episode of diarrhoea contributes to under nutrition; when episodes are prolonged, their impact on growth is increased.

Fortunately, simple and effective treatment measures are available that can markedly reduce diarrhoea deaths, make hospitalization unnecessary in most cases, and prevent the adverse effect of diarrhoea on nutritional status. Practical preventive measures can also be taken that substantially reduce the incidence and severity of diarrhoeal episodes. This unit provides information on the epidemiology and etiology of diarrhoea that is essential for an understanding of the principles of treatment and prevention.

The global burden of Rota viral disease was recently estimated as 111 million cases requiring home care, 25 million cases requiring medical attention, one million requiring hospitalization and 440,000 deaths, annually. In the United States of America (USA), Rota viral infections are responsible for an estimated 500,000 physician visits, 50,000 hospitalizations and 20 to 40 deaths per year. In Australia, it has been estimated that rotavirus infection is the cause

of diarrhoea in 10,000 of the nearly 20,000 adult admitted to hospital each year with severe diarrhoea.

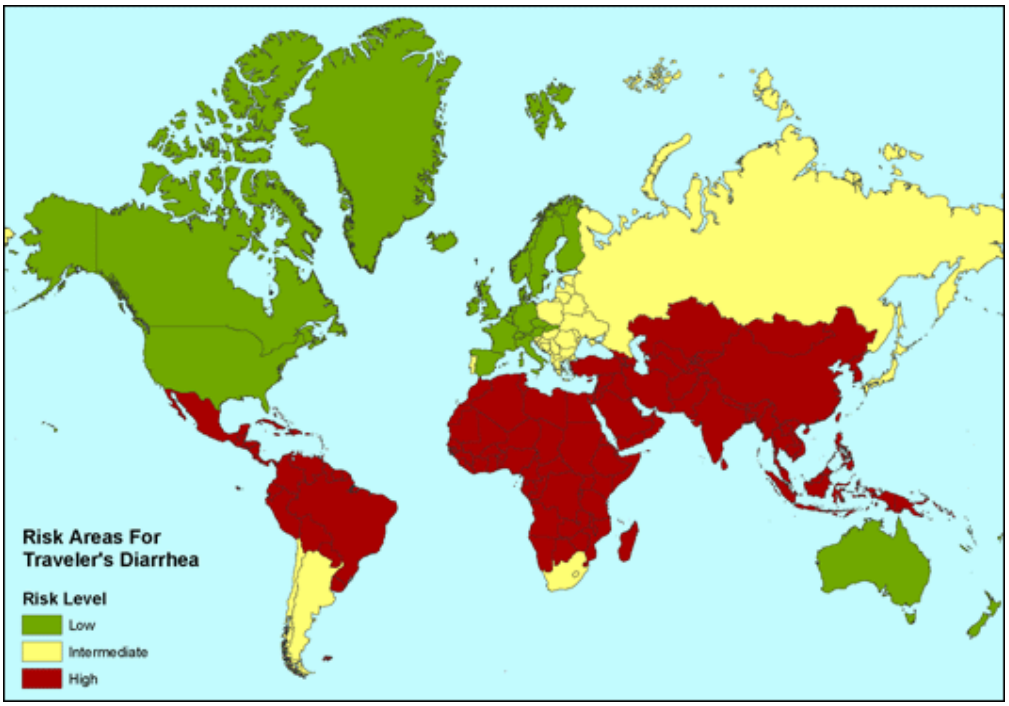
The most important determinant of risk is travel destination, and there are regional differences in both the risk and etiology of diarrhoea. The world map is generally divided into three grades of risk: high, intermediate, and low. Low-risk countries include the USA, Canada, Australia, New Zealand, Japan, and countries in Northern and Western Europe.

Intermediate-risk countries include those in Eastern Europe, South Africa, and some of the Caribbean islands. High-risk areas include most of Asia, the Middle East, Africa, and Central and South America. Some destinations that were previously considered high risk have now been classified as low or intermediate risk, including parts of Southern Europe and some of the Caribbean islands. On average, 30%-50% of travelers to high-risk areas will develop diarrhoea during a 1- to 2-week stay. Based on the annual figure of 50 million travelers to developing countries, this estimate translates to approximately 50,000 cases of diarrhoea each day. In more temperate

regions, there may be seasonal variations in diarrhoea risk. In South Asia, for example, during the hot months preceding the monsoon, much higher diarrhoea attack rates are commonly reported.

Diarrhoeal diseases claim almost 2 million children's lives worldwide every year, often simply because their bodies are weak from lack of fluids and undernourishment. Africa and India alone lose 1.4 million lives to diarrhoeal diseases such as cholera and dysentery caused by poor sanitation and unsafe water. The most important determinant of risk is travel destination, and there are regional differences in both the risk and etiology of diarrhoea. The world map is generally divided into three grades of risk: high, intermediate, and low. Low-risk countries include the USA, Canada,

## AREAS OF RISK FOR TRAVELERS DIARRHOEA




Australia, N.Zealand, Japan & countries in Northern and Western Europe. Intermediate-risk countries include Eastern Europe, S.Africa & some of the Caribbean islands. High-risk areas include most of Asia, Middle East, Africa, Central & S.America. Some destinations that were previously high risk have now been classified as low or intermediate risk, incl. parts of S. Europe and some of the Caribbean islands. On avg, 30%-50% of travelers to high-risk areas will develop Travelers Diarrhoea during a 1- 2 week stay. Based on annual figure of 50 million travelers to developing countries, this estimate translates to approx., 50,000 cases of Travelers Diarrhoea each day.

## DIARRHOEAL DISEASES IN DEVELOPING COUNTRIES

Diarrhoeal diseases impose a heavy burden on developing countries accounting for 1.5 billion bouts of illness a year in Adults. The burden is highest in deprived areas where there is poor sanitation, inadequate hygiene, and unsafe drinking water. In certain developing countries, epidemics of diarrhoeal diseases such as cholera and dysentery strike down adults and children alike. Other major diarrhoeal diseases include typhoid fever and rotavirus, which is the main cause of severe dehydrating diarrhoea among Adults.

Major contributory factors are malnutrition, inadequate provision of safe water, sanitation, and hygiene. Evidence suggests that appropriate water, hygiene, and sanitation interventions can reduce diarrhoeal incidence by 26 per cent and mortality by 65 per cent.

In 1978, when the ICDDR, B was created from the former Cholera Research Laboratory, diarrhoeal diseases were the leading cause of death in nearly all developing countries, and the emphasis on diarrhoea as the critical research issue for developing countries was appropriate. These were exciting times in diarrhoeal disease research with the discovery and application of oral rehydration

therapy, the discovery of important new pathogenic agents, such as rotavirus, enterotoxigenic Escherichia coli, and exciting new approaches for public health interventions to alleviate diarrhoea-associated problems.

## DIARRHOEAL DISEASES IN INDIA

While access to drinking water in India has increased over the past decade, the tremendous adverse impact of unsafe water on health continues. The World Bank estimates 21% of communicable diseases in India are water borne. Of these diseases, diarrhoea alone killed over 700,000 Indians in 1999 (estimated) – over 1,600 deaths each day. Despite investments in water and sanitation infrastructure, many low-income communities in India and other developing countries continue to lack access to safe drinking water. Regardless of the initial water quality, widespread unhygienic practices during water collection and storage, poor hand washing and limited access to sanitation facilities perpetuate the transmission of diarrhoea-causing germs through the faecal-oral route. 1.8 million People die every year from diarrhoeal diseases (including cholera). 88% of diarrhoeal disease is attributed to unsafe water supply, inadequate sanitation, and hygiene.

## DISEASE FOR ADULT IN TAMILNADU

Diarrhoeal disease also represents an economic burden for Tamil Nadu. Here patients with diarrhoea occupy less than a third of the hospital beds for adult. These patients are often treated with expensive intravenous fluids and drugs. Although diarrhoeal disease is usually less harmful to adults than to children, it can also affect the economy of the state by reducing the health of its work force.

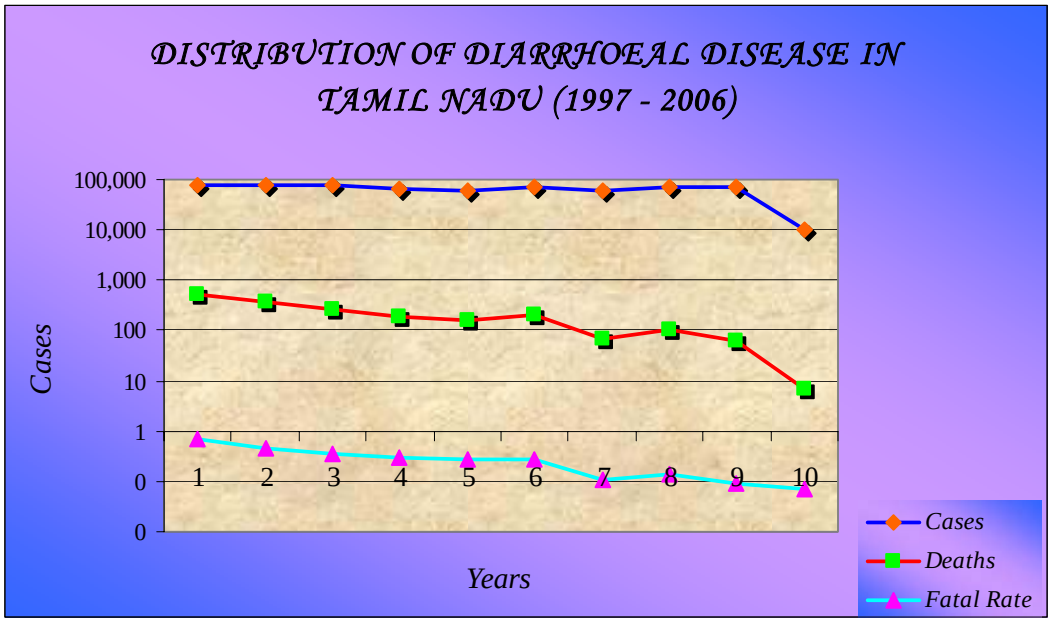
The statistics given below shows the decreasing trends in death and the fatal rate is around 0.07% during 2006.

**DISTRIBUTION OF DIARRHOEAL DISEASE IN TAMIL NADU 1997 – 2006 [Feb]**

| YEAR | CASES | DEATHS | FATAL RATE |
|---|---|---|---|
| 1997 | 78,025 | 520 | 0.67 |
| 1998 | 77,677 | 368 | 0.47 |
| 1999 | 74,583 | 266 | 0.36 |
| 2000 | 64,130 | 195 | 0.30 |
| 2001 | 59,511 | 159 | 0.27 |
| 2002 | 69,889 | 199 | 0.28 |
| 2003 | 58,784 | 66 | 0.11 |
| 2004 | 69,807 | 101 | 0.14 |
| 2005 | 70,465 | 65 | 0.09 |
| 2006 (February) | 9,902 | 7 | 0.07 |

*Source: The National Institute of Communicable Diseases, a premier Institution of the Director*

*General of Health Services, Government of India.*




**Details of Madurai city**

These details are obtained from corporation for the purpose for knowing the socio demographic aspects of the studying region.

Madurai city is situated on the banks of River Vaigai in the south central part of Tamil Nadu. It is located on 9°55″N latitude and 78°07″E longitude, at a distance of about 500kms from Chennai. Madurai city ranks third position in Tamil Nadu with a population of 922913 as per 2001 census. Madurai forms the district headquarters, covering an area of 20.92 km2. The River Vaigai divides

the city into two parts. The city is well connected by road, rail, and air with major urban centers of India. The city being a religious center attracts large number of tourists.

## NATURAL ENVIRONMENT

### PHYSIOGRAPHY

Geographically Madurai is situated in the midway along the course of the River Vaigai at an altitude of 100ft from mean sea level. Hills are not found within Madurai corporation limit. The south, north, and northeast are bounded by small beautiful hills viz; Pasumalai, Sikkandarmalai, Nagamalai, and Anaimalai. Green ranges found around Madera city are Sirumalai, Alagarmalai, Kayandamalai, and Natham hills on the west, north, and northeast of Madurai city at a distance of about 40kms.

### CLIMATE

Madurai city experiences monsoon type of climate. It is generally hot city. The major seasons are as follows:

- The dry season (Jan to March).
- The hot season (April to May).

- ❖ The S.W Monsoon period (June to Sep).
- ❖ The N.E Monsoon period (Oct to Dec).

The dry season is being felt hot and the gentle showers provide little relief in Feb and March. After summer, the monsoon season starts with the usual rainfall during the months from Jun to Sep. About ¼ of the total rain for the year is registered during this period. Oct and Nov are usually the wettest months in the year and about half of the proportion of the total rain is registered during the N.E monsoon in the city.

**RAINFALL**

The city experiences annual rainfall in the N.E monsoon season during Oct and Nov with occasional showers during summer months by the influence of S.W monsoon. The average annual rainfall is 85cms.

**TEMPERATURE**

In the months of April to June Madurai city having high temperature of about 40°c. The average mean, maximum, and minimum temperatures are 32°c, 41.6°, and 20.9°c.

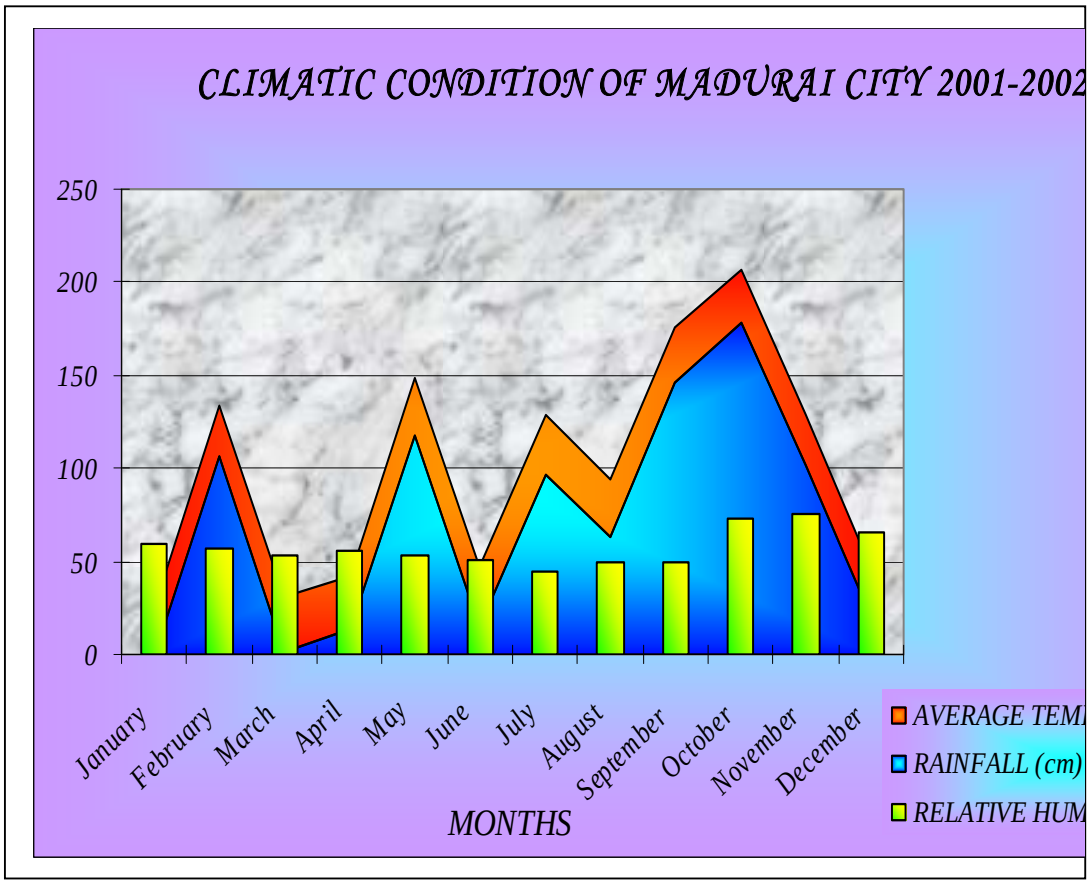
**WIND**

In January and February, the wind blows steadily between the north and eastern direction. From May to July, the prevailing direction is from southwest.

**CLIMATIC CONDITION OF MADURAI CITY 2001-2002**

| MONTHS | RAINFALL | AVERAGE TEMPEATURE | RELATIVE HUMIDITY |
|---|---|---|---|
| January | - | 26.4 | 60 |
| February | 107 | 26.1 | 57 |
| March | 1 | 30.0 | 53 |
| April | 13 | 29.1 | 56 |
| May | 117 | 32.1 | 53 |
| June | 15 | 32.0 | 51 |
| July | 97 | 31.4 | 45 |
| August | 63 | 31.6 | 49 |
| September | 146 | 30.3 | 49 |
| October | 178 | 28.7 | 73 |
| November | 102 | 27.3 | 75 |
| December | 21 | 25.6 | 66 |

*Source: Statistical office Madurai.*




**NATURAL VEGETATION**

Evergreen grooves, mango and coconut trees are concentrated on the banks of river and channels for a long distance. Vegetables, flowers, paddy, and sugarcane are cultivated near the immediate vicinity of Madurai city.

**LANDUSE** General pattern of the existing individual land uses of the city are:

## RESIDENTIAL USE

A good part of the residential area in the Madurai city comprising of the area in and around the Avanimoola streets, Masi streets and Veli streets, which in fact forms the old town, is in a state obsolescence. Here the residential area is mixed with commercial, both wholesale and retail and industrial areas. Moreover, this area is highly built up with the absence of open spaces. This area, being the city center of Madurai, is now congested with multiple activities and different modes of transport. The northern, Western and eastern part of the city consist a number of residential colonies.

## INDUSTRIAL USE

The area under industrial use in the Madurai city is 210.15 hectares consulting 7.10% to the developed area and 0.37% to the total area of the planning area. The major industries are textile mills and cotton ginning factories, manufacturing transport equipments and printing works. They are located within the corporation limit as well as in the peripheral areas. Industries are located mostly in the peripheral areas. Other major mills are rice mills are located on Ramnad road. In the southern part of the city, T.V.S automobile workshop, the biggest

in the city is situated on the south veli street. As population of Madurai grows, more and more area would be required for industrial use.

**COMMERCIAL USE**

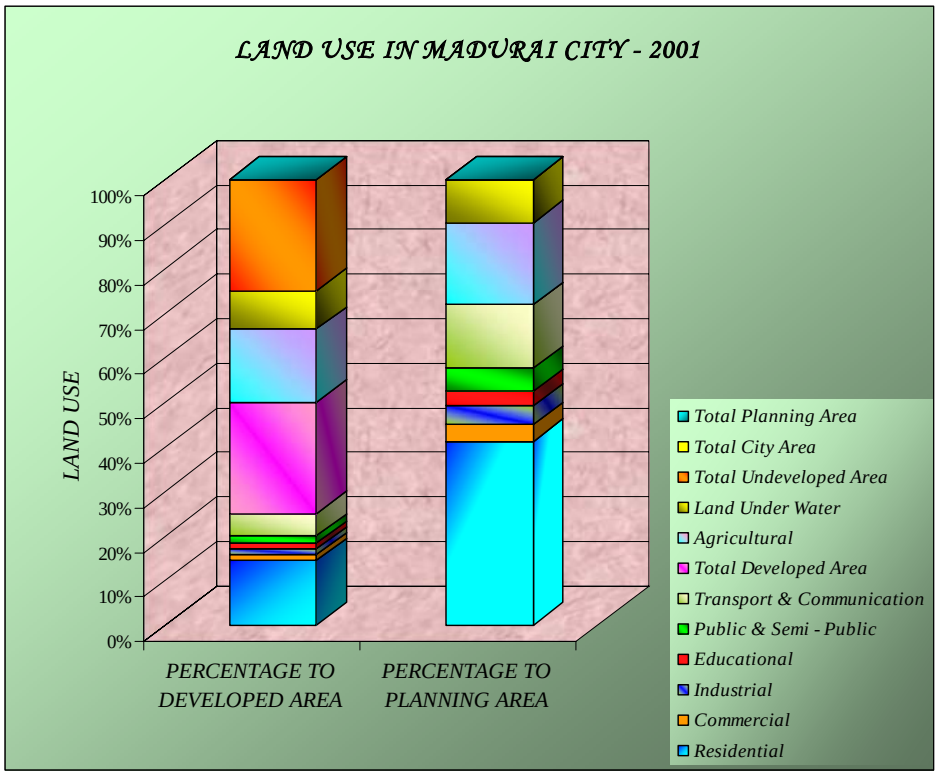
The total area devoted to commercial use in Madurai city is 198.50 hectares, which constitutes 5.32% to the developed area and 0.27% to the total area of the planning area. There is no organized commercial zone in Madurai city. The commercial area is concentrated in the old city around the temple.

All the major streets viz; four Masi streets, Veli streets, Avani Moola streets, Chitrai streets and radial streets, towards the temple are dominated by all type of commercial activities like wholesale and retail business such as textile emporiums, groceries, leather goods and hardware's, furniture shops etc. Along town hall road lodges, fancy goods stores etc., and in the South Avani Moola street jewelry and silver goods shops are concentrated.

# LAND USE IN MADURAI CITY – 2001

| LAND USE PATTERN | EXTENT ( Hec ) | PERCENTAGE TO DEVELOPED AREA | PERCENTAGE TO PLANNING AREA |
|---|---|---|---|
| Residential | 2145.07 | 57.49 | 2.95 |
| Commercial | 198.5 | 5.32 | 0.27 |
| Industrial | 210.15 | 5.63 | 0.29 |
| Educational | 172.05 | 4.61 | 0.24 |
| Public & Semi - Public | 265.19 | 7.1 | 0.37 |
| Transport & Communication | 740.58 | 19.85 | 1.02 |
| **Total Developed Area** | **3731.54** | **100** | **0** |
| Agricultural | 947.95 | 65.34 | 1.31 |
| Land Under Water | 502.82 | 34.66 | 0.7 |
| **Total Undeveloped Area** | **1450.77** | **100** | **0** |
| **Total City Area** | **5182.31** | **0** | **0** |
| **Total Planning Area** | **72636.67** | **0** | **0** |

*Source: Field Survey Records.*



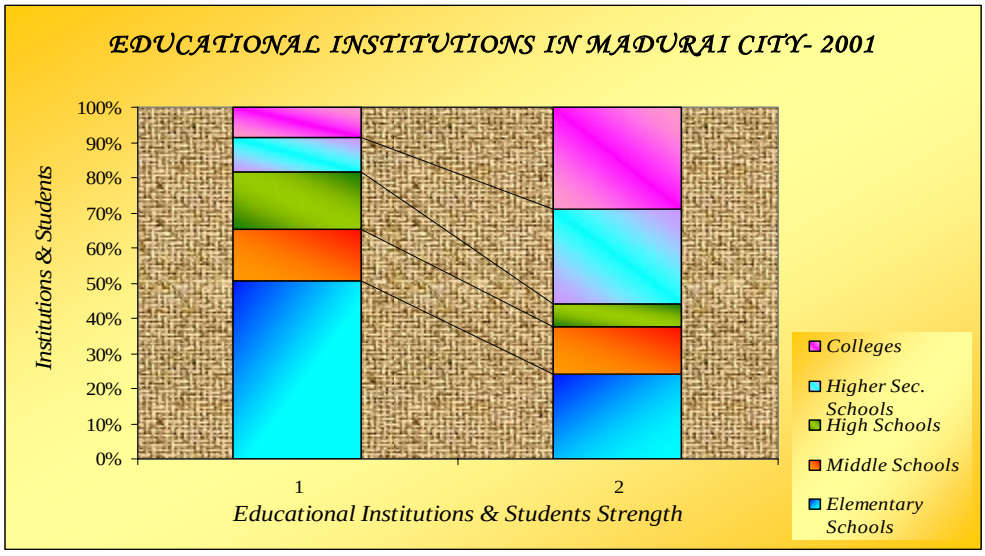

## EDUCATIONAL INSTITUTIONS

The educational institutions cover an area of 172.05 hectares constitutes 4.01% of the developed area 0.24% of the total planned area. Most of the educational institutions viz; law college, American college, Sri Meenakshi College, Government Medical college, Lady Doak College, Fatima College & Wakf Board college are situated in the northern part of the city. Madurai College, Thiyagarajar College, and Government Polytechnics, which are situated in the Southern part of the city.

## EDUCATIONAL INSTITUTIONS IN MADURAI CITY 2001

| TYPE OF EDUCATONAL INSTITUTIONS | NUMBER OF SCHOOLS | STUDENTS STRENGTH |
|---|---|---|
| Elementary Schools | 41 | 8962 |
| Middle Schools | 12 | 5002 |
| High Schools | 13 | 2540 |
| Higher Sec. Schools | 8 | 10058 |
| Colleges | 7 | 10777 |

*Source: Madurai Corporation.*



## HEALTH CARE FACILITY

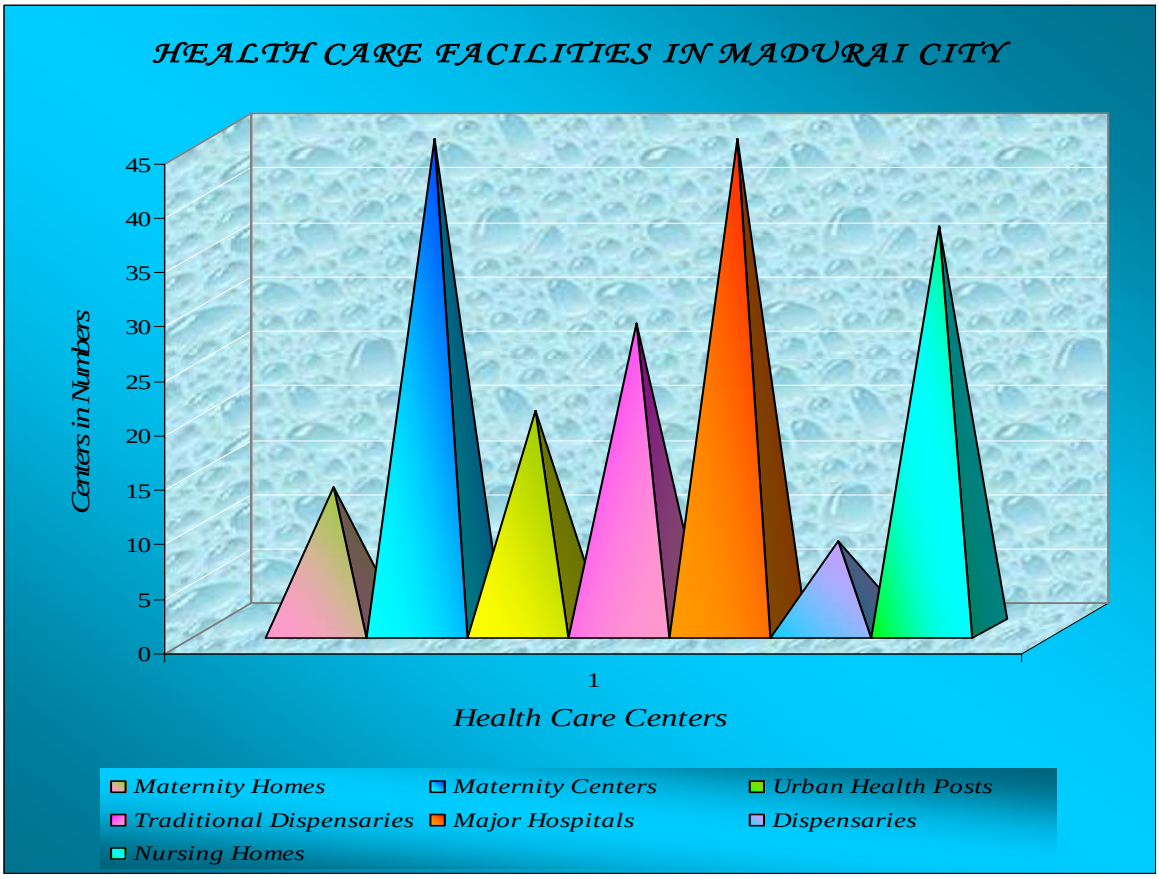
The health care facility in Madurai city is, at present the government Rajaji hospital that is situated along Panagal road in the northern side of river.The other important hospitals are Oriental hospital, Aravind eye hospital and Meenakshi mission hospital. The E.S.I. hospital, American Mission hospital, T.V.S. and railway hospital are the institutions, providing better health care to the patients. Apart from this, there are 5 major hospitals, 45 maternity and family planning centers, 8 dispensaries, 37 nursing homes located in different parts of the local planning area

### HEALTH CARE FACILITIES IN MADURAI CITY 2001

| HEALTH FACILITIES | DETAILS |
|---|---|
| Maternity Homes | 13 |
| Maternity Centers | 45 |
| Urban Health Posts | 20 |
| Traditional Dispensaries | 28 |

| | |
|---|---|
| Major Hospitals | 45 |
| Dispensaries | 8 |
| Nursing Homes | 37 |

**HEALTH CARE FACILITIES IN MADURAI CITY 2001**



# MATERIALS AND METHODS

**Setting** **:**Government Rajaji Hospital,Madurai.

**Collaborating Departments :** Department of Medicine

Madurai Medical College

Madurai.

**Design of the study** **:** Observation study

**Period of study** **:** 1.12.2005 to 31.6.2006

**Sample size** **:** 70

**DEFINITIONS**

**Acute Diarrhoea:** defined as passage of abnormally liquid or unformed Stools at an increased frequency usually stool weight >200gm/day and duration less than two weeks.

**Literacy** : A person is deemed as literate if he can read and write with understanding in any language.

**Socio economic status :**Low- less than 20000 Rs p.a.,

Middle-20000-40000 Rs p.a.,

Upper middle – 40000-62000 Rs p.a**.,**

High – 62000-86000 Rs p.a.,

**Inclusion criteria**

Age greater than 14 years

Acute diarrhoeal patients admitted at GRH

**Exclusion criteria**

Duration of diarrhoea >2 weeks

Nosocomial diarrhoea

**Methods**

1. Name & Address
2. Age
3. Income/day
4. Educational Status
5. Marital Status
6. Religion
7. Occupational Status
8. Type of family
9. Members in Family
10. Socio-Economic Status
11. Type of Home
12. Drainage facility
13. Source of drinking water
14. Personal hygiene
15. H/o contaminated food
16. Season
17. Preference of food
18. Any preexisting systemic illness
19. Drug intake
20. Any native medicine

**Clinical Examination**

1. Signs of dehydration
2. Amount of stools
3. Nature and type of stools
4. Odour and colour of stool
5. abdominal pain ,tenesmus , vomiting

**Ethical committee approval** **:** Obtained

**Consent** **:** Informed consent was obtained

**Financial support** **:** Nil

**Conflict of interest** **:** Nil

# RESULTS & ANALYSIS

Diarrhoea is one of the most important diseases in India. Diarrhoea today continues to remain an important public health problem both in rural and urban areas. The description of spatial variations of a particular disease are attempted at the regional level but limited with respect to micro level. In this context, the present study has focused its importance of micro level to study the spatial distribution of diarrhoeal disease in adult and to analyze the interrelationships between prevalence rate of diarrhoeal disease, in world, developing countries, India, Tamil Nadu and Madurai city.

Disease maps form an essential tool for analyzing the distribution of diarrhoeal disease at world level. Apart from this, the diagrams are used to explain the ideas of distribution of diarrhoeal disease.

## LIMITATIONS OF THE STUDY

The diarrhoeal cases reported from July 2004 to October 2005 government Rajaji hospital in department of medicine at Madurai city was taken as the study area. Due to shortage of time and money, 70 samples were collected in the department of medicine at government Rajaji hospital in Madurai city.

### Data analysis and technique used

The data collected from primary source were converted into variables. The nature and purpose of the study is expressed by variables. These variables help to meet the objective of the present study. Further, the data is converted into analysis and correlated matrix. As the result, 26 variables are obtained by grouping the variables. At the end of the processing, the result helps to find out association and interrelationship among variables. The factor analysis, one of the important statistical techniques used to identify the major dimension in the present study. In this chapter, the association between disease occurrence and socio-economic condition were identified.. Maps can easily convey the ideas, which are to be expressed. Nowadays there are so many software used to construct maps. Thus,

maps are used as an important tool to analyze and compare the distribution of diarrhoeal disease in adult at Madurai city.

**Socio–economic characteristics of diarrhoeal disease in adult**

The analysis of primary data on socio – economic characteristics of diarrhoeal disease in adult, which is collected from questionnaire survey in Department of Medicine, Government Rajaji Hospital, Madurai. They are as follows:

**Socio – economic status**

| Status | No.of patients | Percentage |
|---|---|---|
| High Class | 0 | 0 |
| Upper Middle | 3 | 4 |
| Middle | 38 | 53 |
| Lower middle | 29 | 43 |
| Total | 70 | 100 |

Middle class people are more affected with diarrhea when compared to other category.

**Diarrhoeal disease in adults and associated variables**

**Age structure**

There is a high correlation between age and marital, and diarrhoea after travel, education, income status and source of drinking water. This observation describes that any age can prone to diarrhoeal disease in adult due to these variables.

| Age in Years | No. of patients | Percentage |
|---|---|---|
| 14 - 25 | 15 | 21 |
| 26 – 50 | 32 | 46 |
| 51 – 60 | 14 | 20 |
| Above 60 | 9 | 13 |
| Total | 70 | 100 |

Diarrhoea affects most commonly in age group - 26-50 yrs.

**Marital status and Gender**

High relationship is seen married people than unmarried with the disease. Probably due to life style modification and contamination of food , also due to reduced care for himself than for the family. There has be Gender variation ,female patients are more hospitalized. Above reasons also holds good for this variation.

**Gender Distribution**

| Sex | No. of patients | Percentage |
|---|---|---|
| Male | 30 | 43 |
| Female | 40 | 57 |
| Total | 70 | 100 |

Diarrhoea is more common in female patients (57%).

**Occupational status And Income status**

There is high correlation among occupation, religion. Also with income status, living environment .There is a high relationship among religion, occupation, and diarrhoeal disease. When there is low occupational status then there will be low income, which leads to poor socio-economic condition and unhygienic living environment. These may be the probable reasons leading to diarrhoeal disease in adult. More number of coolies (56%) was affected by diarrhoeal disease, Homemakers (20%), Private concern (10%), and Others (14%) are also affected by diarrhoeal disease

**Educational status**

On analyzing this variable there is insignificant relationship with Literacy, but patients who are above higher secondary have incidence of diarrhoeal disease than lower standards of education. Good awareness about health hazards may be the reason for this variation Also early management of the disease must the reason for non hospitalization.

**Educational status**

| Educational Status | No. of patients | Percentage |
|---|---|---|
| Illiterate | 35 | **50** |
| Elementary | 22 | 31 |
| High School | 11 | 16 |
| Higher Secondary | 2 | 3 |
| Total | 70 | 100 |

**Preference of food**

There is low relationship food preference of food and acquiring knowledge The hygienic person may also cause diarrhoeal disease due to preference of contaminated food for the sake of good taste.

**Living environment**

There is a high correlation between living environment. Low relation with native medicine . Intake of native medicine is high in rural than in urban areas. Low occupational status leads to poor environmental condition.

**Reason for diarrhoea**

| Reason for diarrhoea | No.of patients | Percentage |
|---|---|---|
| Unpurified water | 8 | 11 |
| Contamination of food | 29 | 41 |
| Poor sanitation | 12 | 17 |
| Personal hygiene | 14 | 20 |
| Others | 7 | 10 |
| Total | 70 | 100 |

Due to contamination of food, patients more no. of patients are affected due to diarrhoea (41%). 20% of the patients affected due to poor personal hygiene . 17% of the patients affected due to poor sanitation and 11% of the patients affected due to unpurified water.

**Socio-economic conditions**

High correlation prevails between socio-economic conditions and income status, occupation and religion. Low income is highly prone to diarrhoeal disease than high-income group. High income provides good education and good living environment. This condition restricts the occurrence of diarrhoeal disease in high-income group. Vice versa in low-income group.

**Home type**

High relationship prevails between home type and source of drinking water. If home type is satisfactory then the source of the drinking water will also be good and the household garbage's are disposed away from the house. The observation describes that, if there is good living environment there will be low prevalence of diarrhoeal disease and systemic disease. Living environment also determines the home type.

**Source of drinking water**

High relationship prevails between source of drinking water, home type, household garbage and livestock kept. This relationship shows that if the source of drinking water is good the occurrence of diarrhoeal disease will be low. High-income group can afford more money to obtain pure water but low-income group consume any source of water.

The analysis of the socio-economic characteristics of diarrhoeal disease in Adult of Madurai city in relation with Govt Rajaji Hospital and was depicted with the help of maps. At the end of the processing, the result helps to find out association and interrelationship among variables. From the above analysis, we can conclude that Poor

personal hygiene and income are the direct indicators associated with high prevalence of diarrhoeal disease in adult. Unpurified water supply is highly related to the cause of diarrhoeal disease in adult.

**Clinical aspect of Diarrhoea**

On analyzing the clinical aspect of Diarrhoea ,patient reporting here are usually severely dehydrated as per my study and are often associated with vomiting with or without abdominal pain. Probable reason may be , during the initial period patient takes his own treatment in the form of home made rehydration therapy .

**Clinical aspect of Dehydration**

| Dehydration | No.of patients | Percentage |
|---|---|---|
| Severe | 40 | 57 |
| Some | 30 | 43 |

**Symptoms of Vomiting and abdominal pain**

| Symptoms | No.of patients | Percentage |
|---|---|---|
| Yes | 48 | 69 |
| No | 22 | 31 |

# DISCUSSION

In my study, **70** adult acute diarrhoeal patients who were admitted in medicine department. Among the 70 patients **30 were males** and 40 **were females**. This study was undertaken between the period of 1.12.2005 to 31.6.2006. Informed consent was obtained from all the patients before inclusion in this study. Apart from relevant medical history and physical examination including vitals, were taken.

**A detailed history** was taken with emphasis on socioeconomic status and dietary habits., family history , social conditions, economic status were taken up.

The distribution of diarrhoeal disease in Madurai city for adult is 1445 cases, which is recorded, in the secondary data obtained from Department of Medicine, Government Rajaji Hospital from which 70 inpatients were taken for study. The age structure of the diarrhoeal disease patient for Madurai city reveals that the majority of the people belongs to the age group 20-40% yrs (43%) were affected by diarrhoeal disease, next comes the age group of 40-60 yrs (37%) were affected by diarrhoeal disease. The age group of 12-20 years (10%) was prevalence to the diarrhoeal disease. The prevalence of diarrhoeal

disease is high in female (57%) than male (43%). Low income people was highly affected by the diarrhoeal disease in Madurai city than the high income group people i.e., the prevalence rate is 57% in low income group, 43% of middle income group and 10% of high income group. This condition indicates that low standard of living and low per capita income is highly associated occurrence of diarrhoeal disease. The poor education status of diarrhoeal disease patient is one of the main reasons for more number of diarrhoeal cases in Madurai city. Most of the uneducated people (50%) are affected by diarrhoeal disease than educated people .

The poor educational status and poor knowledge about the disease is one of the main reasons for the occurrence of diarrhoeal disease. The religion plays a dominant role in the occurrence of diarrhoeal disease. More number of Hindus (83%) was affected by diarrhoeal disease than Muslims (10%) and Christians (7%). The occupation structure is the major yardstick to measure the occurrence of diarrhoeal disease. More number of coolies (56%) was affected by diarrhoeal disease. Homemakers (20%), Private concern (10%), and Others (14%) are affected by diarrhoeal disease. Thus, there is a close associated between the occupational structures and the spread of diarrhoeal disease. The married person (83%) is more prevalence to the spread of diarrhoeal disease than unmarried persons (17%). This prevalence rate is

high among the married persons in Madurai city. Joint family (47%) is majority affected by diarrhoeal disease than the Nuclear family (46%) and Separate (7%). Thus, the distribution of diarrhoeal disease is highly associated with socio-economic and socio-cultural characteristics of Madurai city.

**PERSON WISE DISTRIBUTION**

Most diarrhoeal episodes occur during the first two years of life. This pattern reflects the combined effects of declining levels of maternally acquired antibodies, the lack of active immunity in adult, the intake of food that may be contaminated with faecal bacteria and direct contact with human or animal faeces. Most enteric pathogens stimulate at least partial immunity against repeated infection or illness, which helps to explain the declining incidence of disease in adults.

**TIME WISE DISTRIBUTION**

Distinct seasonal patterns of diarrhoea occur in many geographical areas. In temperate climates, bacterial diarrhoea tend to occur more frequently during the warm season, whereas viral diarrhoea, particularly disease caused by rotavirus, peak during the winter. In tropical

areas, rotavirus diarrhoea tends to occur throughout the year, increasing in frequency during the drier, cool months, whereas bacterial diarrhoea tend to peak during the warmer, rainy season. The incidence of persistent diarrhoea follows the same seasonal pattern as that of acute watery diarrhoea. Diarrhoea was season-dependent in, with the highest prevalence during the rainy season and the lowest during the dry season.

"The attack is nothing unusual in the post-monsoon period. At this time every year scores of people are attacked with such diseases. The reason for such attacks is taking contaminated food and water," said Dr. Kanak Ranjan Talukder, director of Communicable Disease Control at the health directorate.

According to experts, diarrhoeal disease is very common in Bangladesh with two seasonal outbreaks, one in the dry season in autumn, and another during monsoon (June-July). *Rota Virus, E Coli bacteria, Salmonella*, and of course cholera, are the main causative agents. Rota viral diarrhoea is common in adult during this season. The recent diarrhoeal incidence has peaked about one and a half months ago in the northern districts and is continuing at the same rate. It has now have become countrywide.

## SUMMARY

Disease can be best understood by most of the people within context of health. Health and disease cannot be viewed as an opposing sides of a coin, but instead they are coexisting overlapping state(pyle,1979). Diarrhoeal diseases claims nearly two million lives a year among adults, imposing huge burden in developing countries. From July 2004 to October 2005 diarrhoeal disease affect 3152 adults get admitted at GRH & increasing , hence taken up for this study. The study was based on primary & secondary data. The primary Data has been systematically collected for the present study based on a sampling procedure keeping in a view of time and cost, only 70 sample patients who have been randomly selected. The Department of medicine in GRH of Madurai was chosen as the place to conduct using random sampling procedure. However secondary data was insufficient to fulfill the aims and objectives and hence the primary data was collected .

The main sources of secondary data are collected from patient case sheets, text books, journals, and internet. The secondary data is designed to include 19 variables which are systematically collected from the Department of Medicine Government Rajaji Hospital, Madurai.

**The major aims and objectives of the present study are :**

- To analyze the prevalence rate and spatial distribution of the diarrhoeal disease in Adult at Madurai city.

- To identify social aspects of the diarrhoeal disease in Adult with reference to socio economic conditions and To observe the regional variation and to identify the causes for its occurrence

- To bring out the inter relationships between disease occurrence and risk factors such as age ,gender, family ember, home type , income status, preference of food, personal hygiene, acquiring knowledge, marital status, religion, source of drinking water and socio economic conditions .

- To conceptualized the facts and bring out in a conceptual frame work.

The distribution of diarrhoeal diseases is not uniform everywhere & it differs from place to place .To support the hypothesis ,maps are constructed with the help of primary &secondary data. It is easy to identify the regions which are repeatedly affected by diarrhoeal diseases among adult in places of Sellur, Goripalayam, Pudur, Thathaneri, Vilangudi, Annanagar, Mathichiyam, Alwarpuram , B.B.kulam , Narimedu , Ahimsapuram , Meenakshipuram , Kailasapuram, Bethaniyapuram, Arapalayam, Tamilsangam, Ismailpuram , Sourastra school,Palanganatham, Ellis nagar,Solaialagupuram, Jaihindpuram, Keerathurai ,Villapuram, Kamarajapuram,and Anupanadi. Mostly males are highly prone to diarrhoeal diseases due to their exposure to pathogens very easily and due to their genetic make up. The high concentration in these regions is due to poor maintenance and poor socio economic conditions especially in Sellur, Pudur, Anna nagar, Thathaneri, regions where moderate population density exposing to partial sewage system,low income,lack of personal hygiene, low literacy rate, poor living environment and unhygienic conditions. Since diarrhoeal disease is water borne, poorly maintained water tank is the major source for spread the disease. More cases are reported during summer, due to excess demand and lack of safe drinking water .

The main view point is to understand the causal relationships between the diarrhoeal disease occurrence and associated variables. The purpose of the study is to fulfill the way of identifying the association and interrelationships between variables of diarrhoeal diseases in adults. As many as seven dimensions are extracted with the help of factor analysis The analysis of the socio-demographic and clinical aspects of acute diarrhoeal disease in Adult of Madurai city was depicted with the help of correlation matrix which is derived by using t-test is made to prove the hypothesis. At the end of the processing, the result helps to find out association and interrelationship among variables. A significant level is attempted that is both one-tail and two-tail test is used to find out the significance variables and to analyze the association between variables. From the above analysis we can conclude that Poor personal hygiene and low income, illiteracy are the direct indicators associated with high prevalence of diarrhoeal disease in adult. Unpurified water supply is highly related to the cause of diarrhoeal disease in adult.

# CONCLUSION

**1.** Illiterates are mostly affected due to Acute diarrhoeal disease

**2.** Females are more affected.

**3.** Adults (26-50yrs) are more affected.

**4.** Low income pts are more affected.

**5.** Hindus are more affected.

**6.** Joint families (> 4) are mostly affected.

**7.** Married patients are more affected.

**8.** Unpurified drinking water and poor drainage facility are important risk factors.

**9.** Poor personal hygiene is also important determinant.

**10.** Contaminant food – major predisposing factors.

**11.** Mixed diet pts are more prone for Acute diarrhoeal disease

**12.** Summer season one of the predisposing factor.

**13.** Severe dehydration is the usual reason for hospitalization.

**14.** Vomiting with abdominal pain - usual associated symptoms.

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*PROFORMA*

# QUESTIONNAIRE SURVEY ON SOCIO DEMOGRAPHIC CLINICAL ASPECTS OF ACUTE DIARRHOEAL DISEASE AMONG ADULT IN MADURAI CITY 2005 - 2006

**Unit No :**
**Ward No.**
**I.P. No. :**
**Rajaji Hospital,**
**O. P. No. :**
**College,**

**O. CHANDRAN,**
**: M.D., (Gen.Med)**
**VII Medical Unit, Govt.**

**Madurai Medical**

**Madurai.**

1. Name & Address
2. Age :
3. Income/day :
4. Educational Status :
   Illiterate/Elementary/H.School/H.Sc./College/.Professional/University.
5. Marital Status : Married / Unmarried / Others
6. Religion : Hind / Muslim / Christian / Others
7. Occupational Status : Housewife / Govt. Employee / Coolie / Business / Private Concern/Others.
8. Type of Family : Join / Nuclear / Separate.
9. Members in Family : <2 / 3 / 4 / >4
10. Socio-Economic Status : High / Upper Middle / Middle/ Lower Middle / Others.
11. Type of Home : Hut / Kuchha / Pacca Flat / Independent House / Sharing.

| **S.No.** | **Conditions of your** | **Good** | Satisfactory | **Fair** | **Poor** |
|---|---|---|---|---|---|
| 12. | Living Environment | | | | |
| 13. | Drainage Facility | | | | |
| 14. | Supply of Drinking Water | | | | |
| | **Did you wash your hands with Soap.** | **Yes** | **No** | **Some Times** | **Not Applicable** |
| 15. | After toilet | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 16. | After treating Infant Stool | | | | |
| 17. | After washing innerwear's | | | | |
| 18. | Before Cooking | | | | |
| 19. | Before Serving food | | | | |
| 20. | Before taking food | | | | |
| 21. | After taking food | | | | |
| 22. | After treating pet & domestic animals | | | | |
| | **Did you** | **Yes** | **No** | **Some Times** | **Don't Know** |
| 23. | Check you water supply before consumption | | | | |
| 24. | Any Sewage Channel running near your house | | | | |
| 25. | Go toilet on open space | | | | |
| 26. | Check toilet facility outside your home | | | | |
| 27. | Clean your nails properly while washing your hands | | | | |
| 28. | Preserve your food from files, insects. etc. | | | | |
| 29. | Wash Vegetables, Fruits, Cereals before cooking | | | | |
| 30. | Prefer to Drink Boiled Water | | | | |
| 31. | Take preserved food | | | | |
| 32. | Take already prepared Food | | | | |
| 33. | Check the quality of buying eatables in groceries | | | | |
| 34. | Drink water everywhere | | | | |
| 35. | Go outside without footwear's | | | | |
| 36. | Whether it is a Curable Disease | | | | |
| 37. | Any other member suffer with diarrhoea in your family | | | | |
| 38. | Buy medicine for Diarrhoea from the Pharmacy on your own | | | | |
| 39. | Know that people die of Diarrhoea | | | | |
| 40. | Do you prefer any Alcohol | | | | |
| 41. | Do you undergone any Radiation Theraphy | | | | |
| 42. | Do you prefer Hotel Food | | | | |
| 43. | Any diarrhoeal occurrence after travel | | | | |

| S. No. | Symptoms - Macroscopic Appearance | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 44. | Amount of Stools (Volume) | Large Quantity | Small Quantity | | | | | |
| 45. | Nature & Type of Stools | Watery | Semi Solid | Frothy | | | | |
| 46. | Odour of Stools | Yes | No | Sometimes | Don't Know | | | |
| 47. | Is there Stomach pain during diarrhoea | Yes | No | Sometimes | Don' Know | | | |
| 48. | Tenesmus | Yes | No | Sometime | Don't Know | | | |
| 49. | Colour of stools | Light Colour | Dark Colour | Blood Contamination | | | | |
| 50. | What type of diarrohea you had | Normal Diarrhoea | Serious Diarrhoea | V.Serious Diarrhoea | | | | |
| 51. | Which season the diarrhoea occurs | Summer | Winter | Rainy | | | | |
| 52. | Reasons for cause of Diarrhoea | Unpurified Water | Contaminated food | Poor Sanitation | Personal Hygience | Emotional Distress | Fate | God's Will |
| 53. | Intestine motility | Increase | Decrease | | | | | |
| 54. | Type of food intake during diarrhoea | Solution | Soft Food | Solid Food | Others | | | |

55. Preference of food : Vegetarian / Non-Vegetarian / Mixed

56. History of De hydration : Yes / No
    if Yes, What_____

57. Frequency of Diarrhoea : _____ Times

58. Duration of Diarrhoeal Disease : _____ Days.

59. Where do you dispose Household : Backside of your house/outside village/ Garbages / Near
Roadside / Open Field / Hired Cart.

60. Source of Drinking Water : Well/Tank/Corporation/Borewell/ Lorry/Mineral Water/
Municipal

61. How many times clean your House: Morning / Evening / Daily / Twice a day.

62. Bathing Habit : Once a day / Twice a day / Others.

63. When do you cut your nails : Weekly / Periodically / Monthly.

64. How many times you cook per day: 1 / 2 / 3 / >3

65. How many times you take food in a day: 1 / 2 / 3 / >3

66. Whether livestock kept : Yes / No
if yes, Where :

67. Do you acquire knowledge : Yes / No
if yes, how :

68. Past History of any Operation: Yes / No
(Post Vagotomy) :

69. Do you have Systemic Disease : Hyperthyroid/Hypo thyroid/Hypo Para Thyroid/ Jaundice
Diabetes/Collagen vascular disorder/ T.B./ AIDS /
Whipple's Disease / Addison's disease / Mal absorption/
Tropical Sprue/ Coeliac Disease / Intestinal Lymphoma /
IBD / Others / Nil.

70. Any Drug Intake : Bisacodyl/Liquid Paraffin/Antacid/ Milk of Magnesia/
Heavy metal/ Diuretics/

Colchicine / Anti biotic/ Lactulose/Castor Oil/ Digoxin/ Sorbitol/ Propronol / Theophylline / Laxative/ Others / Nil.

71. What type of Treatement undergone : IV fluids (RL,DNS, NS) Antibiotics/ (Ciprofloxacin, Metronidazole Others.

72. Did you take any Native Medicine : Seeru / Thokkam / Salt Sugar Solution/ Hospital ORS

73. Investigation : Urea_____/ Glucose_____/ Creatinine_____

74. IV fluids : _____ Bottles.

75. Conclusion :

Reason for Diarrhoeal Disease :

_____

*MASTER CHART*

| S.No | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 73 | M | LM | M | 1 | 3/1 | 2 | 1 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 1 |
| 2 | 3 | 25 | M | LM | M | 1 | 3/2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 3 | 4 | 2 | 1 |
| 3 | 1 | 22 | M | M | UM | 1 | 4/1 | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 2 | 1 | 2 |
| 4 | 2 | 26 | F | M | M | 1 | 4/2 | 1 | 3 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 1 | 1 |
| 5 | 2 | 37 | F | LM | M | 2 | 2/2 | 2 | 1 | 1 | 2 | 2 | 1 | 3 | 2 | 1 | 3 | 2 | 1 | 1 |
| 6 | 1 | 45 | F | LM | M | 1 | 4/2 | 1 | 1 | 1 | 3 | 2 | 1 | 3 | 2 | 1 | 3 | 2 | 2 | 2 |
| 7 | 1 | 54 | F | LM | M | 1 | 2/2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 1 |
| 8 | 1 | 55 | F | LM | M | 1 | 2/3 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 2 |
| 9 | 1 | 35 | M | UM | M | 1 | 4/1 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 1 |
| 10 | 1 | 28 | F | M | M | 1 | 4/1 | 1 | 3 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 1 |
| 11 | 1 | 29 | F | M | M | 1 | 4/2 | 1 | 3 | 1 | 2 | 2 | 1 | 3 | 2 | 1 | 3 | 1 | 2 | 1 |
| 12 | 4 | 18 | M | LM | UM | 1 | 4/1 | 2 | 1 | 1 | 2 | 2 | 1 | 3 | 2 | 1 | 3 | 2 | 2 | 1 |
| 13 | 1 | 65 | M | M | M | 1 | 4/1 | 1 | 1 | 2 | 2 | 2 | 1 | 3 | 2 | 1 | 3 | 4 | 1 | 1 |
| 14 | 2 | 32 | M | M | M | 1 | 4/2 | 1 | 3 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 |
| 15 | 1 | 27 | F | LM | M | 3 | 4/2 | 2 | 3 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 2 |
| 16 | 3 | 42 | F | LM | M | 1 | 2/2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 1 | 1 | 2 |
| 17 | 2 | 56 | M | M | M | 1 | 4/1 | 2 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 1 | 3 | 5 | 2 | 1 |
| 18 | 2 | 60 | M | LM | M | 1 | 4/1 | 2 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 1 | 3 | 5 | 2 | 1 |
| 19 | 2 | 75 | F | LM | M | 2 | 4/1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 1 | 1 |
| 20 | 1 | 60 | M | M | M | 1 | 2/2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 4 | 2 | 1 |
| 21 | 1 | 35 | F | LM | M | 1 | 4/2 | 2 | 3 | 1 | 2 | 2 | 1 | 3 | 1 | 1 | 3 | 3 | 1 | 1 |
| 22 | 2 | 45 | M | M | M | 1 | 4/1 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 3 | 5 | 2 | 2 |
| 23 | 1 | 52 | F | M | M | 2 | 4/1 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 3 | 2 | 2 | 2 |
| 24 | 2 | 21 | F | M | M | 1 | 4/1 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 5 | 2 | 2 |
| 25 | 1 | 16 | M | UM | M | 1 | 3/1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 3 | 5 | 1 | 1 |
| 26 | 2 | 20 | M | M | M | 1 | 3/2 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 4 | 1 | 1 |
| 27 | 3 | 20 | M | M | M | 1 | 4/1 | 2 | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 1 | 3 | 2 | 1 |
| 28 | 1 | 48 | M | M | M | 1 | 4/1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 |
| 29 | 3 | 29 | M | M | M | 1 | 3/2 | 2 | 2 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 2 | 3 | 2 | 2 |
| 30 | 3 | 25 | M | M | M | 1 | 4/2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| 31 | 3 | 26 | F | M | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 3 | 2 | 2 |
| 32 | 3 | 35 | F | M | M | 1 | 3/1 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 1 | 1 |
| 33 | 2 | 55 | F | M | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 1 | 1 | 2 |
| 34 | 2 | 40 | M | UM | M | 1 | 4/2 | 1 | 2 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 1 |
| 35 | 2 | 38 | M | LM | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 3 | 1 | 1 |
| 36 | 3 | 25 | M | M | M | 1 | 4/1 | 2 | 2 | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 3 | 3 | 2 | 1 |
| 37 | 1 | 60 | M | LM | M | 1 | 3/2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2 |
| 38 | 1 | 55 | F | LM | M | 1 | 4/1 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 5 | 2 | 1 |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | 1 | 52 | F | M | M | 1 | 2/3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| 40 | 3 | 15 | F | LM | M | 1 | 4/2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 1 |
| 41 | 1 | 42 | F | M | M | 1 | 4/2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 2 |
| 42 | 2 | 28 | M | M | M | 1 | 4/1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 1 |
| 43 | 1 | 70 | F | M | M | 1 | 4/1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 3 | 2 | 1 |
| 44 | 1 | 34 | M | M | M | 1 | 4/2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 1 |
| 45 | 1 | 50 | F | M | M | 1 | 3/2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 1 | 2 |
| 46 | 1 | 46 | M | UM | M | 1 | 4/1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 4 | 1 | 1 |
| 47 | 1 | 27 | F | M | M | 1 | 4/2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| 48 | 2 | 17 | F | M | M | 1 | 4/1 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 4 | 2 | 2 |
| 49 | 3 | 45 | F | M | M | 1 | 4/2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 1 |
| 50 | 3 | 30 | M | M | M | 1 | 4/1 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 1 |
| 51 | 1 | 22 | F | LM | M | 1 | 4/2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 3 | 1 | 1 |
| 52 | 1 | 35 | F | LM | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 4 | 1 | 2 |
| 53 | 1 | 45 | M | LM | M | 1 | 4/2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 4 | 1 | 1 |
| 54 | 1 | 60 | F | LM | M | 1 | 3/2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 3 | 1 | 1 |
| 55 | 2 | 14 | F | M | UM | 1 | 4/1 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 1 |
| 56 | 2 | 45 | M | LM | M | 1 | 4/2 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 1 | 4 | 2 | 2 |
| 57 | 1 | 68 | M | M | M | 1 | 3/2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 4 | 2 | 1 |
| 58 | 2 | 32 | F | M | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 2 | 2 | 1 | 3 | 2 | 2 |
| 59 | 1 | 48 | F | LM | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| 60 | 1 | 55 | F | M | M | 1 | 4/1 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 1 |
| 61 | 3 | 16 | F | M | M | 1 | 4/2 | 2 | 2 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 3 | 2 | 1 | 1 |
| 62 | 1 | 45 | F | UM | M | 1 | 4/2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 5 | 2 | 2 |
| 63 | 1 | 80 | M | LM | M | 1 | 2/2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 1 | 1 |
| 64 | 2 | 14 | M | M | UM | 1 | 4/2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 |
| 65 | 2 | 40 | F | M | M | 1 | 4/2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 2 |
| 66 | 1 | 55 | F | LM | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| 67 | 1 | 60 | F | M | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 4 | 1 | 1 |
| 68 | 1 | 70 | F | M | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 1 |
| 69 | 2 | 50 | M | M | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 4 | 1 | 1 |
| 70 | 2 | 76 | F | LM | M | 1 | 4/1 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 3 | 2 | 1 | 1 |

**A = Educational status**

1. Illiterate
2. Elementary
3. High school
4. HSC

**B = Age**

**C = Sex**

M- Male

F-Female

**D = Socio economic status**

H - High

M- Middle

UM- Upper middle

LM- Lower middle

**E=marital status**

M - Married

UM- Unmarried

**F= RELIGION**

1.Hindu

2.Muslim

3.Christian

**G=Members in family/ Type of family**

≤ 2

3

≥ 4

1. Joint
2. Nuclear
3. Separate

**H=Drainage facility**

1. Good

2. Fair

**I =Supply of drinking water**

1. good

2. Fair

**J = Personal hygiene**

1. Good

2. Fair

**K = Contaminated food taken**

1. yes
2. No
3. Sometimes

**L = Type of Diarrhoea symptoms**

1. Normal

2. Serious

3. Very Serious

**M = H/O Dehydration with**

1. Yes

2. No

**N = Preference of Food**

1. Vegetarian

2. Non vegetarian

3. Mixed

**O = Associated with Systemic Disease**

1. Yes

2. No

**P = H/O Drug Intake**

1. Yes

2. No

**Q = Seasonal Diarrhoea**

1. Summer

2. Winter

3. Rainy

**R = Reason of Diarrhoea**

1. Unpurified Water

2. Contaminated Food

3. Poor Sanitation

4. Personal Hygiene

5. Fate

**R = Signs of Dehydration**

1. Some

2. Severe

**S = Symptoms of Vomiting / Abdominal Pain**

1.Yes

2. No

# *ANALYSIS OF SOCIO DEMOGRAPHIC AND CLINICAL ASPECTS OF ACUTE DIARRHOEAL DISEASE AMONG ADULTS*